IV. ISP Perspectives

To understand how the cable industry has dealt with some ISPs, CTC held discussions with two ISPs: Earthlink, a nationally-known ISP currently offering service over cable systems in selected trial markets, and EasyStreet, an Oregon ISP not offering service on cable systems. Neither Earthlink nor EasyStreet is a cable operator partner or affiliate.

The interviews with the ISPs yielded three broad conclusions. The ISPs:

- Believe that cable operators tend to limit the number of ISPs on their networks and the services they can provide.
- Would like to use the cable system as a content-neutral "pipe" to the subscriber.
- Prefer the policy-based routing type of open-access over rebranding.

The ISPs believe that cable operators prefer to limit the number of ISPs on their networks and to limit the breadth of services these ISPs can offer on the networks. In their view, the cable companies take the most significant steps toward opening their networks when forced by regulation, as was the case when AOLTW was required to open TWC's networks as a condition of the merger.

The ISPs want to use the cable system as a "pipe" to the subscriber in a way that leaves them free to provide a wide range of services to subscribers, including video-on-demand, voice-over-IP, virtual private networks, and hosting of mail and Web content. Some cable companies have sought in negotiations with potential ISP partners to limit an ISP's ability to offer many of the above services over a cable system. The ISPs also believe that the most efficient delivery of advanced services calls for locating their routers and servers at cable NOCs or headends, which are currently proprietary facilities without co-location areas open to outside companies.

There are technological reasons for placing some limitations on the capabilities of the ISP or an ISP customer on a cable network. These include a desire not to overload the cable modem system beyond its capacity, particularly in the upstream direction, where bandwidth will be limited for the foreseeable future. These inherent limitations in cable modem capabilities may need to be addressed by the future upgrade of networks, for example, to the Public Interest Architecture proposed below.

However, it must be noted that many cable operators and ISPs affiliated with cable operators want to provide a wide range of advanced Internet services, and may wish to have the benefit of being the sole providers of video-on-demand or voice-over-IP on cable networks. In this scenario, the cable operator opens its network for multiple providers of "Internet browsing" services but is able to keep its network closed to unaffiliated providers of more advanced online services.

The ISPs with whom CTC engineers spoke prefer the PBR option to rebranding because PBR can be configured to allow them to offer differentiated services and Internet connections rather than limiting them to reselling the package provided by the operator.

4.1 Earthlink

CTC's engineer spoke with Greg Collins, Earthlink's Director of Network Engineering and Operations, on November 6, 2001, regarding open access and Earthlink's plans for broadband cable deployment.

4.1.1 Current Access to Cable Systems

Current broadband deployment by Earthlink is over DSL and over cable modems in select markets. Earthlink offers Internet service on Charter cable modem systems. However, that service is not branded as an Earthlink product; rather, Earthlink works as Charter's contractor.

Earthlink offers services on Time-Warner Cable systems. On these systems, TWC is in control of the connection from the cable system to the Internet and routes all Earthlink mail and proprietary content traffic to the ISP through the Internet. Earthlink customers connect to the Internet through the TWC's backbone connection just as TWC's cable modem customers do. Earthlink has no presence at the headend and there is no peering arrangement at intermediate Internet Point-Of-Presence (POP) or Network Access Points (NAP). The arrangement is similar to the rebranding arrangement on the Click! Network cable modem system (see Appendix A), except that the ISP is more limited in its ability to guarantee service level to its customers, because it does not provision a circuit directly to the headend for access by its customers to mail and proprietary content services.

An Earthlink customer on a TWC system contracts directly with Earthlink. TWC handles all aspects of physical installation.

4.1.2 Potential Access to Cable Systems

Under the consent decree imposed as a condition of the merger between AOL and Time Warner, TWC was required to support multiple ISPs. Earthlink had concluded an access agreement with TWC prior to the merger, and was specifically identified by the FTC as a required partner for AOLTW.[41] According to Collins, AOLTW planned to give access to multiple ISPs through multiple DHCP address pools, one of which would be reserved for Earthlink. A policy-based router would sit at the core of the network.

According to Collins, AOLTW now claims that it cannot technically implement PBR. Collins believes that the limitation is the inability of the Cisco 7000/7500 series routers used by AOLTW to perform PBR for a large number of customers. Equipment manufacturers such as Juniper Networks (see Section III above) believe that their equipment can make PBR open access possible on systems such as TWC's.

[41] "FTC Approves AOL/Time Warner Merger with Conditions," http://www.ftc.gov/opa/2000/12/aol.htm.

As of this writing, a PBR open access solution has not been implemented on any large American cable system. However, there is no technical reason why PBR cannot be implemented on an HFC system such as those owned by TWC, given the appropriate equipment and willingness on the part of AOLTW to configure it for open access.

In terms of facilities-based competition, Collins pointed out one advantage of cable over DSL. Cable enables an ISP or content provider to geographically isolate an area by headend service area, whereas this capability is much more limited with DSL, which can often only be isolated by local access transport area or state.

Earthlink has begun trials with AT&T Broadband, but at the time of the discussion with Collins, these plans were on hold because of uncertainty about the status of Excite@Home. Earthlink may also conduct trials with other cable companies, including Cox, Comcast, and Mediacom.

According to Collins, cable companies with whom Earthlink is negotiating potential access have attempted to limit the services Earthlink can provide over their systems. They have attempted to place limitations on services such as DVD-quality video; voice-over-IP; personal video recorder; turnkey home networking solutions; business and corporate data services; and video-on-demand and subscription video-on-demand services. These restrictions would effectively make cable operators and their affiliated ISPs the sole providers of advanced services over cable.

Cable operators are also seeking to bill competing ISPs for subscriber downloads that exceed certain levels, according to Collins. For example, AOLTW was seeking a limit of two or three GB per customer. Earthlink, in contrast, wanted limits of five GB upstream and 10 GB downstream. Collins believes that AOLTW was communicating that bandwidth was "available, but you had better not use it."

According to Collins, TWC attempted to restrict Earthlink from offering virtual private networking over TWC systems. However, these restrictions were eased because AOL wanted virtual private network capability, and the FTC/FCC decree required that AOL be subject to the same limitations as those that apply to competitive ISPs.

4.1.3 Earthlink's Vision of Open Access

According to Collins, Earthlink would ideally like to see an open access scenario with the following four characteristics:

- The cable operator would offer Earthlink access to high quality connections to subscribers without significant degradation problems.

- Earthlink would be able to install equipment at the headend or network operations center to deliver its desired product offerings. Earthlink is interested in handling caching and having content servers located as close to the network edge as possible.

- PBR would be the technical model used to provide open access.
- The cable companies would continue aggregating their headends to serve larger numbers of customers, reducing the burden on cable companies and ISPs for co-location of facilities.

Collins believes that the cable industry, if forced to implement some form of open access, will push as hard as possible for the rebranding model and will drag its feet in implementing PBR or any solution that involves installation of ISP infrastructure at the headend.

4.2 EasyStreet

A CTC engineer spoke with Rich Bader, President of EasyStreet, on November 26, 2001 regarding open access and EasyStreet's plans for broadband cable deployment. EasyStreet is a regional Oregon ISP with many customers in the Portland area. EasyStreet has 3,000 broadband subscribers and is one of the largest providers of broadband services in Oregon.

4.2.1 Current Access to Cable Systems

EasyStreet currently does not have access to any cable systems. EasyStreet offers broadband services over DSL connections provisioned by Verizon, Qwest, or Covad.

4.2.2 Potential Access to Cable Systems

According to Bader, EasyStreet is currently not investing much energy in attempting to secure access to the cable system because it has low expectations that AT&T would open its network to competing ISPs. According to Bader, to the extent AT&T is considering multiple ISP access, it is primarily seeking large partners rather than local ISPs like EasyStreet.

4.2.3 EasyStreet's Vision of Open Access

According to Bader, EasyStreet is interested in offering service over cable because cable has strong residential penetration. Cable passes more homes than DSL-ready telephone lines and Bader believes cable broadband would be a less expensive option for a customer already connected to cable service than offering service to that customer over DSL.

According to Bader, EasyStreet would ideally like to have open access to cable systems with the following four characteristics:

- Carriers would provide and maintain the physical and data link aspects of the system through telephone, cable, wireless, or other medium.

- The operator would be responsible for operation of the cable modem platform.
- Deployment would use standards-based protocols with clear lines of demarcation.
- Carriers would be allowed to compete in other aspects of the system in a nondiscriminatory manner.

Like Earthlink, EasyStreet is primarily interested in a PBR scenario under which the ISP has as much control of quality of service as possible. EasyStreet is not interested in merely reselling the cable operator's wholesale product. Bader stated that marketing and customer support are not sufficient incentives for EasyStreet to seek open access because he believes that there is not sufficient profit in those sectors.

V. Technical Recommendations

5.1 Short-Term Recommendations for Strategies By Which a Cable Company Can Enable Open Access

In the short term, there are some strategies that a cable operator can implement to develop a network more conducive to the public interest. These strategies generally require only small modifications to cable modem equipment already installed. They do not necessarily require construction of new cable plant or upgrades of outdoor plant. To some extent, the model of open access that the cable operator implements will determine the degree of challenge in implementing an open access network.

For example, in the rebranding model, the operator will have relatively minimal changes in equipment, but will need to coordinate with the ISPs their responsibilities for installing customers, connecting the ISPs with the cable modem network router, customer support, and billing. One approach to addressing these issues was used by Tacoma Click!, which developed a Request for Qualifications (Appendix A) for ISPs. Cable operators anticipating open access could develop such a document to enable potential partners to apply for carriage on the network and to serve as the basis for negotiations regarding how the ISP would be carried on the network.

As is discussed in Section III above, PBR or the separate-channel solution constitute preferable open access models for the public interest because they provide non-affiliated ISPs a greater role in delivering service to customers and more choice regarding the types of service to offer. To implement PBR open access, the cable operator and ISPs will need to do the same coordination as for the rebranding model. In addition, the cable operator will need to replace or upgrade router equipment in the headend, set aside space for the equipment ISPs will need to install in the headend or network operations center, and negotiate with ISPs details of how network addressing and routing will work.

5.1.1 Make Open Access Modifications During Upgrades and Conversions

Ideally, some of these modifications can be incorporated into a rebuild or upgrade plan so as to achieve economies of scale and minimize inconvenience. For example, when a system is upgraded to provide cable modem services, the headend is usually enhanced and new hub facilities are constructed.

5.1.2 Provide for Headend Co-Location

The primary issue is to ensure sufficient space in the headend for co-location by other ISPs and content providers. Some headends and network operations centers are already carrier-class facilities, with sufficient rack space for expansion. In metropolitan areas, cable operators typically have planned for expandability for the headend; therefore, rack space should not be an insurmountable problem, and can be leased to ISPs just as it is in Internet co-location facilities. Cable companies may wish to examine the models used in telephone central offices and Internet network access points for co-location. Some ISPs already lease fiber optics to unaffiliated service providers or competitive local exchange carriers and have co-location arrangements for these customers.

5.1.3 Upgrade Headend Router

The router that interconnects the cable operator and/or Internet backbone to the cable modem network must be capable of filter-based forwarding and be able to forward data packets based on the source address of the packet. The router must also have the capability to handle PBR for the volume of customers and ISPs who will be using the network. For a large metropolitan area headend, the cable operator may need to replace the existing router with a higher performance router. If the cable operator needs to replace a router when it reconnects its Excite@Home customers to an operator-affiliated ISP, it would be advisable for the operator to plan for PBR capability in the router.

5.1.4 Repair May Be Needed to Outdoor Cable Plant for Separate-Channel Solution

The cable plant does not need modifications to enable open access in the DOCSIS-compliant cable architecture currently deployed by most cable operators. Cable modems connect in a standardized manner in all DOCSIS cable modem systems. To implement PBR-based open access in a DOCSIS environment, the modifications required to the cable modem system take place at the system headend router, in the ISP network, and on the customer's computer or network router. (See Section III). None of these modifications involves changes in outdoor cable plant; any network that is capable of providing cable modem service from a single provider will not need outdoor plant modification to provide cable modem service from multiple ISPs.

In the event that total cable modem network usage increases as the new providers are added, the operator may need to increase network capacity by segmenting its network into smaller node service areas. This may require adding equipment inside node enclosures and additional ports at headends and hubs, but in the short-term is unlikely to require new cable plant or outdoor construction.

To implement the separate-channel solution, the cable operator may also need to make sure its upstream spectrum is clear over a wide enough range of channels to support multiple providers. Currently, many providers assign the cleanest part of their upstream spectrum to their cable modem services and do not track down sources of interference or noise in the rest of their upstream spectrum. In order to provide sufficient spectrum for multiple ISPs to carry services on separate channels, cable operators may need to fix loose connectors, replace damaged cables, replace damaged service drops, and filter noise entering the cable system from indoor wiring in subscriber residences.

5.2 Long-Term Recommendations: Public Interest Architecture

If open access is the goal, policy makers and cable operators should work toward the adoption of a Public Interest Architecture, a broadband infrastructure that addresses the engineering challenges of offering advanced services to consumers by anticipating future bandwidth needs, and by taking as a central principle the idea that networks grow and succeed when they are open to a broad range of service providers by technological design and by policy. A system utilizing this architecture would support such policy goals as broad consumer access at a range of prices; a variety of service offerings; user-friendly Internet access; and competition. Such a system would simultaneously serve the commercial interests of the relevant industries because it would support such potentially lucrative offerings as video-on-demand; interactive video; web-enhanced television; small business applications; and games/virtual reality.

The Public Interest Architecture proposed here consists of the following:

5.2.1 Construct Extensive Fiber Optics

Public policies should encourage the construction of fiber optics as deep into the system, and thus close to users, as possible. Where new housing developments are constructed, carriers and builders should take advantage of the fact that fiber optic construction costs are comparable to twisted-pair or coaxial construction costs, and complete fiber optic construction to individual apartments, office units, or homes if feasible.

5.2.2 Construct Survivable, Redundant Architecture

The operator should construct survivable physical architecture as far as possible into the network. Fiber optics should be constructed in a ring or a ring-within-ring architecture so that a cable break or failure of an individual component will not cut off services.

Network components should be deployed with sufficient standby electrical power so that the system can continue operation through an electrical failure until electricity is restored. This is particularly critical for network telephone service, alarms, and other lifeline emergency requirements.

5.2.3 Enable Access to Diversity of Providers

Ideally, customers should be able to obtain services from a diversity of facilities-based carriers offering voice, data, and video service over a variety of transmission media, including coaxial cable, fiber optics, or wireless signals.

There should also be diversity of service providers on individual facilities-based networks, particularly in the event that facilities-based competition is not available. This diversity enables user to choose among providers of similar services, even if they do not have choice among transmission media.

To facilitate this diversity, ISPs and potential application providers (such as IP telephony or video-on-demand providers) should have access to central offices, headends, and hub facilities of broadband networks to be able to deploy server content close to customers. This access should be nondiscriminatory and priced at market rates.

ISPs and application providers should be able to obtain access to necessary capacity on broadband networks, in a nondiscriminatory manner and at market prices, to provide services and applications with required quality of service.

5.2.4 Standardize Equipment

Standardization of user equipment, network server equipment, and switching equipment is necessary to speed deployment of new services and applications. Each item of consumer electronics should be available from multiple providers. Consumers can purchase necessary hardware in stores or online. For example, equipment such as cable modems, set top converters, game equipment, and interactive video equipment should be available from multiple equipment vendors in an electronics store or online. The equipment should be standardized so that the user can change geographic locations or service providers and still use the same equipment. To a great extent, this is already happening with DOCSIS-compliant cable modems. The trend needs to continue as Web-TV, interactive video, game equipment, and other technologies are deployed on the DOCSIS platform. As fiber moves to the curb or the home, cable operators and service providers ideally should make their fiber services available using standardized technologies such as Ethernet or SONET (or their successor technologies).

Appendix A: Click! Network, Tacoma, Washington

The Click! Network in Tacoma, Washington is an "overbuilt" cable system. Click! has affected the broadband competitive market in two ways.: first, it created facilities-based competition with the existing cable company for both cable and cable modem services; and second, it provides access to other ISPs on its network under the rebranding model.

A CTC engineer met with Click! staff in Tacoma, Washington on October 25, 2001 and toured Click! facilities. CTC obtained follow-up information in telephone discussions with Brian Wilson, who served as Communications Supervisor of Franchise and I-Net Management for the City of Tacoma and was responsible for the City's oversight of Click! and AT&T Broadband during the first three years that Click! offered service.

I. Background

In the late 1990s, the Click! Network was formed by Tacoma's electrical utility to offer competitive cable and wholesale Internet services as a competitor to the incumbent cable operator, AT&T Broadband. Click! is an "overbuilder," a term that refers to companies that build plant to offer services in areas already served by an incumbent company that has generally had a monopoly until then.

Tacoma Power constructed Click! in 1998 as a communications system to provide the following services:

- Communications between Tacoma Power facilities, including substations and meters.
- Commercial broadband services.
- Cable television.
- Residential Internet.
- Residential power meter reading.

According to Diane Lachel, Click! Director of Government Relations, the concept of Click! originated when Steve Klein, Superintendent of Tacoma City Light (TCL), participated in discussions of telecommunications deregulation in 1992 in U.S. Congress. At the time, TCL was engaged in a process of strategic planning and reorganization. A five-year period of study led to a reorganization of TCL into a number of different departments for power generation, power transmission and distribution, power management, energy processes (inspection and conservation), and telecommunications. The telecommunications department became Click!

In 1996, Stanford Research Institute (SRI) was hired to assist TCL in developing a business plan for Click! based on the strengths and weaknesses of TCL. This research served as the basis for many of the business strategies adopted by Click!, including: 1) to provide cable television competition, 2) not to compete with existing local businesses other than the cable operator, and 3) an emphasis on customer service and network reliability. According to Lachel, there were significant problems with communications infrastructure in the City of Tacoma, including:

- Lack of availability of suitable telecommunications services to interconnect TCL substations to the energy control center.
- Twelve to 18-month wait periods for business telephone connections in downtown Tacoma.
- U.S. West's inability to connect some residents to telephone service and its provision of cellular telephones instead.
- The cable television had 36 channels, while neighboring communities had many more channels.
- The cable television service prompted many customer complaints, averaging four to five calls to the City per day.

According to Lachel, TCL had cash in reserve from sale of energy from its generation facilities and was required by its charter to reinvest the money in the City.

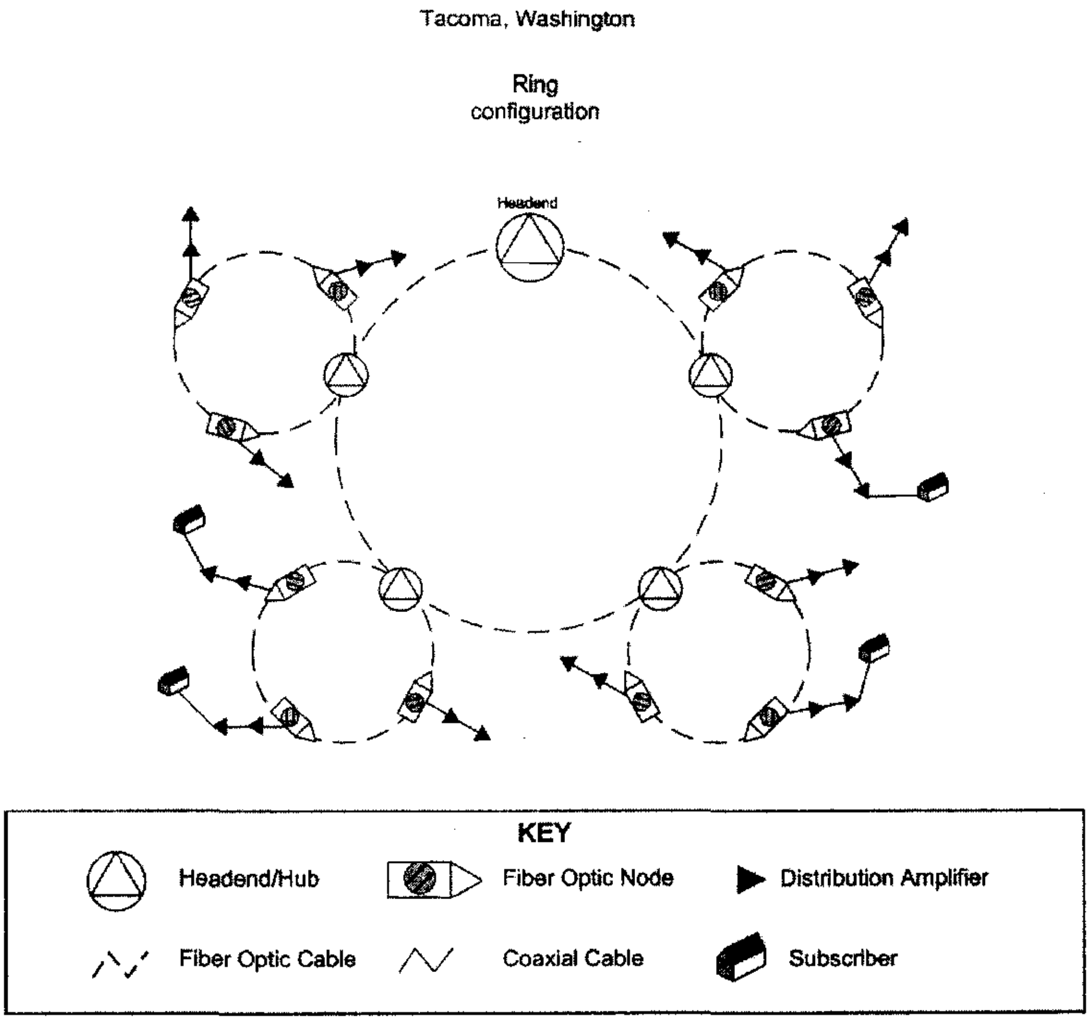
In 1997 TCL developed a more detailed business plan internally. According to TCL, the research for the plan included community focus groups.

II. Network Architecture

The Tacoma system was designed and built in the late-1990s as a utility grade network. It has backup power in the cable plant and a redundantly-routed fiber optic backbone ring (see Figure A-1). Network construction began in April 1997 and the first cable customer was connected in August 1998.

All fiber in Tacoma is structured in loops, including fiber to neighborhood nodes.

Figure A-1: Click! Network Architecture



The network architecture includes the following characteristics:

- Fiber optic backbone between headend and six backbone hubs located in Tacoma Power substations or former power substations in a figure-eight topology.
- 775 miles of cable plant.
- Service in City of Tacoma, backbone scalable to serve entire Tacoma Power service area.
- Survivable fiber optic rings (service loops) from hubs to nodes serving 1,000 to 1,200 homes.
- 96 to 144 fibers on each service loop.
- Design of nodes to enable splitting into four parts without construction of additional cable.
- Maximum amplifier cascade of four.

- 750 MHz capacity coaxial cable plant two-way activated.
- Electronic status monitoring of headend equipment, hubs, nodes, power supplies, and amplifiers.
- Eight hour battery backup and diesel generators at headend and hubs.
- Four hour standby battery backup in power supplies.
- Analog and digital satellite receivers at the headend.
- Scientific Atlanta Continuum modulators for analog channels.
- General Instruments C8U up-converters for digital channels.
- Video lineup originated from headend.
- Video sent from headend to hubs over RF amplitude modulated optical signals.
- SONET fiber optic transport backbone for data and voice.
- Motorola CFT2000 addressable analog set-top converters.
- Motorola DCT2000 digital set-top converters.
- Data network originated at hub sites and narrowcast to and from individual nodes.
- Emergency Alert System (EAS).
- Eighty-nine analog video channels.
- Ninety-one digital video channels.
- RG-6 quad-shielded drop cable.
- Five public, educational, and government (PEG) channels, with one additional channel pending, uplinked from downtown master control center to Click! over fiber optic feed.
- Video programming negotiated through contract through the National Cable Television Co-op.

A fiber optic data network for commercial customers and carriers began service in March 1999. The data and voice network operates over a Nortel SONET infrastructure around the backbone and service loop fiber. Backbone capacity is OC-48 (2.4 Gbps) with circuits available to users from fractional T1 to OC-48 in ring or point-to-point topology. Over 200 circuits are in use. Customers include competitive local exchange providers such as Advanced Telecommunications Group (ATG) and Electric Lightwave, Inc. (ELI). The majority of end-users of the infrastructure contract with CLECs or ISPs reselling services over the network.

III. Cable Modem Network

A cable-modem based data network for residential and small-business users in Tacoma operates over the cable television infrastructure. It began operation in September 1999. According to Lachel and Wilson, the Tacoma City council did not want Click! to cut into the revenues of local businesses, which became an important factor in the decision for Click! to provide its data network as a wholesale service. Three local ISPs contract directly with the customer. One additional ISP, OlyWaNet, is no longer marketing services on the network. ATG recently acquired OlyWaNet and, according to Lachel, Click! is not sure of the future status of OlyWaNet customers.

The Click! cable modem network has the following characteristics:

- DOCSIS 1.0 compliant cable modem termination system and modems.
- Two load-sharing fail-safe DS3 (two 45 Mbps) connections from network to Internet backbone.
- Single Class B IP subnet.
- Local cache stores recently requested content.
- Domain name services, DHCP server at network operations center.
- VPN services permitted, with some ISPs assisting customers in setting up VPNs across the network.
- Hosting of content by end-users prohibited.
- T1 connections to each ISP for value-added services including E-mail, Web-hosting, and customer care.
- Two levels of service: 1) dynamic IP with 128 kbps upstream and 1 Mbps downstream and 2) static IP addresses with 256 kbps upstream and 2 Mbps downstream.
- Traffic between cable modem users and the Internet travels through the Click! network and does not pass through the ISP, unless it is related to the value-added services from the ISP.

A customer contracts with one of three ISPs (currently Harbornet, Net Venture, and Advanced Stream). Click! installs the physical connection to the house and any internal wiring required. The user installs the modem or has the ISP install it. The ISP is responsible for the customer having the PC correctly configured and network interface card (NIC) installed. The ISP takes customer calls and is the point of contact with Click! in the event of a network problem. The ISP pays Click! a fee for using the network, and Click! pays for the Internet backbone connections.

ISPs join the network if they are approved through a request for qualifications (RFQ) process. The first RFQ was issued February 2000. Four providers joined the network. Since then, three have left and two others have joined the network. There is currently an open RFQ to join the network. The RFQ requires:

- An initial connection fee.
- Monthly usage charge.
- A dedicated T1 circuit to the Click! gateway.
- Ability to offer e-mail services.
- Customer service during some evening and weekend hours in addition to regular business days and hours.
- Non-discriminatory service.
- Ability to install and verify function of end-user equipment within 10 business days of request.
- Experience in responding to local market.

Click! staff estimated that their network can support up to six ISPs. According to Lachel, there are more than 3,000 Click! cable modem customers, and approximately 300 signed up with Click! following the temporary disconnection of cable modem service on AT&T Broadband.

Click! customers can also obtain cable-based Internet access and e-mail on their television sets using a service called WorldGate. Users access WorldGate's services on their televisions using analog or digital set-top converters, a remote control, and keyboard. WorldGate is a first generation interactive television system; to the user, it resembles WebTV, which provides similar services over phone lines rather than cable. WorldGate servers are located at the Click! headend and hubs, and they reformat Internet content for digital transmission to the set-top converters, which generate the signal to the subscriber's television. WorldGate is offered over Click!'s cable, but not over the DOCSIS cable modem. Unlike DOCSIS, it is a proprietary platform, so its technological evolution is controlled by WorldGate and its industry partners.

The disadvantage of WorldGate is that some Internet content is poorly displayed on a television set, as opposed to on a higher-resolution computer monitor. In addition, the platform does not support some commonly-used Internet applications, including RealVideo. WorldGate is designed for customers with limited Internet needs who do not own a computer.

IV. Results of Competition

The construction of the Click! Network resulted in facilities-based competition in the cable modem area. According to Wilson, a dramatic improvement resulted from AT&T's efforts to upgrade customer service and technology, presumably in response to the competitive environment created by the advent of Click! Wilson never received a complaint from a Click! Subscriber, at the same time as he received daily complaints from AT&T customers. After Click! began providing service, Wilson saw a significant improvement in the volume of complaints regarding AT&T's services. AT&T now offers telephone services, is beginning to offer video-on-demand, and is significantly more advanced than most cable systems.

V. The Tacoma Institutional Networks (I-Net)

Two I-Net systems operate in Tacoma, both running on the Click! network. Their respective franchise agreements with the City require both AT&T Broadband and Click! to construct an I-Net. AT&T proposed a managed network with monthly recurring costs. Click! proposed to construct fiber optic plant and install electronics at its incremental cost, with the City operating the network.

The City chose Click!'s model and arranged for AT&T to provide a capital grant rather than meeting its obligations with respect to an I-Net and origination sites. The City then used the capital grant money and franchise fees to pay for I-Net sites on Click!.

The agreement between the City of Tacoma and Click! requires Click! to pay a five percent franchise fee, one percent PEG and I-Net capital grant, and eight percent tax. Click! is required to construct, at incremental cost, fiber optic and coaxial cable plant to designated facilities.

Click! is also required to maintain and operate signal transport over two networks: 1) a hybrid-fiber coaxial network, and 2) a fiber optic SONET-based network.

The first Click! I-Net is an analog hybrid fiber-coax system that is a mirror of the cable television system. According to Lachel, 45 sites are connected to the HFC I-Net.

The network feeds video to a master control center in downtown Tacoma. The analog HFC has some capability for data and voice using a cable modem-based system similar to that on the Click! subscriber network.

The second I-Net includes fiber optics to the I-Net facility and provisions a circuit across the network, as specified by the City, using the Click! SONET backbone. Approximately 300 locations are delineated in the AT&T and Click! Franchise Agreements for potential I-Net use, but only 18 locations have been connected because of cost. The SONET network brings OC-3 (155 Mbps) capacity into each facility and enables the I-Net user to add and drop circuits at a facility depending on its requirements.